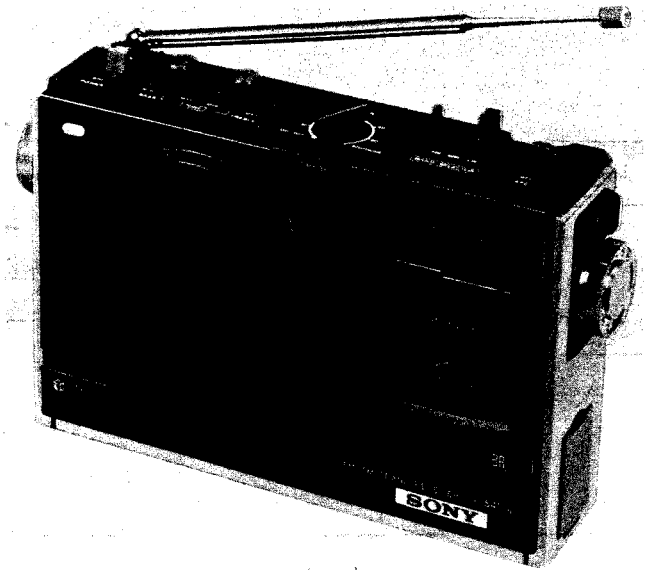
ICF-5450L

AEP Model
UK Model



3-BAND PORTABLE RADIO

SPECIFICATIONS

Circuit: Superheterodyne

Aerials:
FM: telescopic antenna (7 steps, 86 cm)
LW, MW: ferrite-rod (10 mm dia x 180 mm)

Frequency Ranges:
FM: 87.5 – 108 MHz (3.43 – 2.78 m)
LW: 150 – 285 kHz (2,000 – 1,050 m)
MW: 530 – 1,605 kHz (566 – 187 m)

Intermediate Frequencies:
FM: 10.7 MHz
LW/MW: 468 kHz

Jacks:
Earphone jack
Record out jack
MPX OUT jack
EXT POWER IN DC 4.5 V
TIMER IN jack

Power Requirements:
DC: 4.5 V
Battery size-C, 3 pcs
Car battery cord DCC-127H for 12-V car battery
AC: 240 V, 50 Hz with Sony AC Power Adaptor AC-14 (UK model),
110, 220 V, 50/60 Hz with Sony AC Power Pack AC-456C or AC-3W (AEP model)

Current Drain: DC 45 mA with no signal input at AM
DC 50 mA with no signal input at FM

Maximum Power Output: 1,800 mW at 10 % distortion

Speaker: 10 cm (4 inches) dia, 8 Ω

Semiconductors: 10 transistors, 6 diodes, 1 IC
1 FET

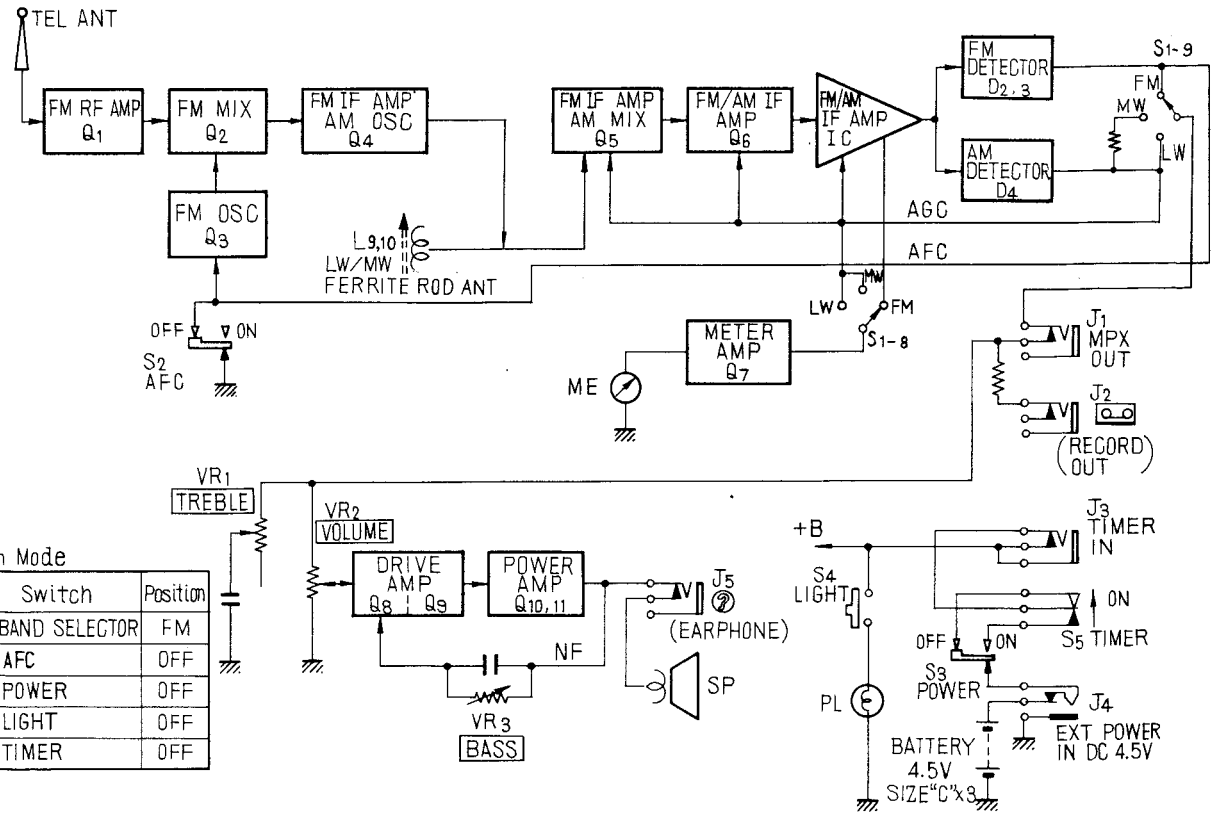
Dimensions: 248 (w) x 160 (h) x 70 (d) mm
9¾ (w) x 6¼ (h) x 2⅞ (d) inches

Weight: 1.3 kg, 2 lb 15 oz with batteries

SONY®
SERVICE MANUAL

SECTION 1
OUTLINE

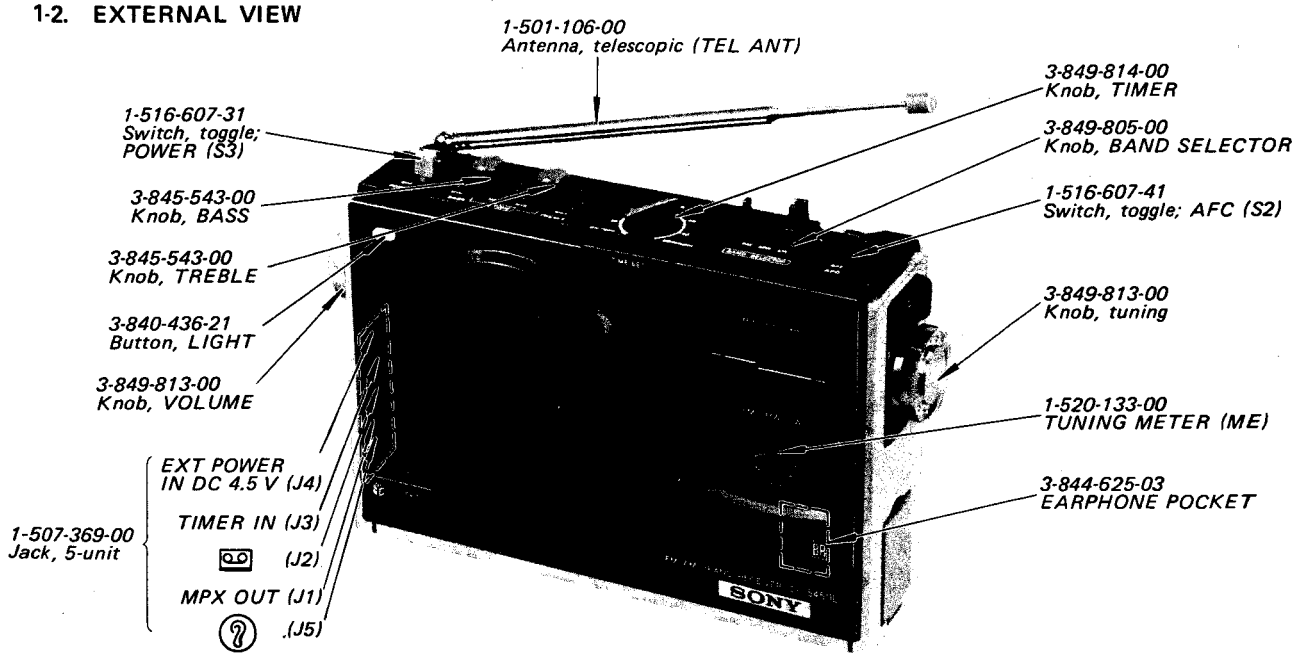
1-1. BLOCK DIAGRAM



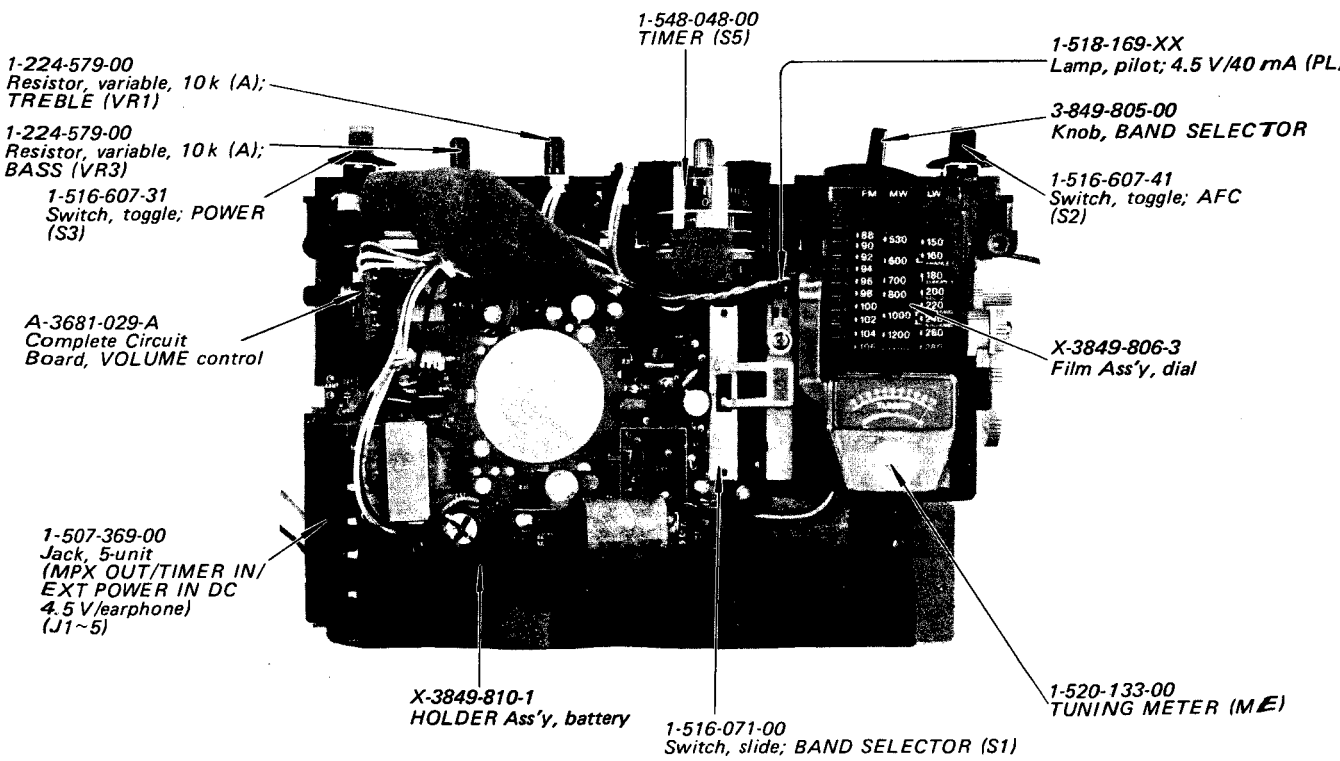
• Switch Mode

Ref. No.	Switch	Position
S1	BAND SELECTOR	FM
S2	AFC	OFF
S3	POWER	OFF
S4	LIGHT	OFF
S5	TIMER	OFF

1-2. EXTERNAL VIEW

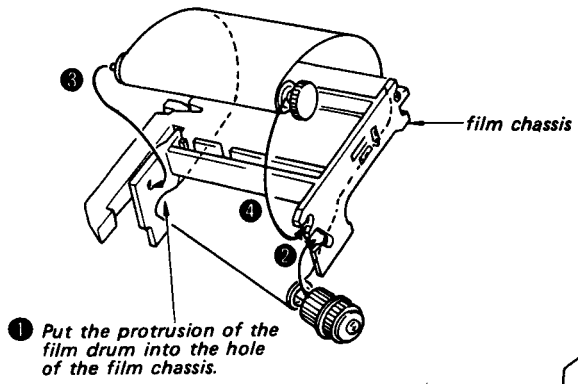


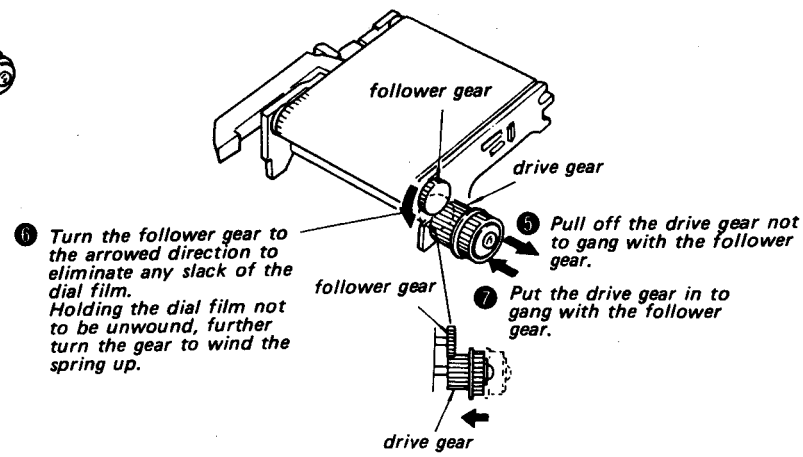
1-3. INTERNAL VIEW

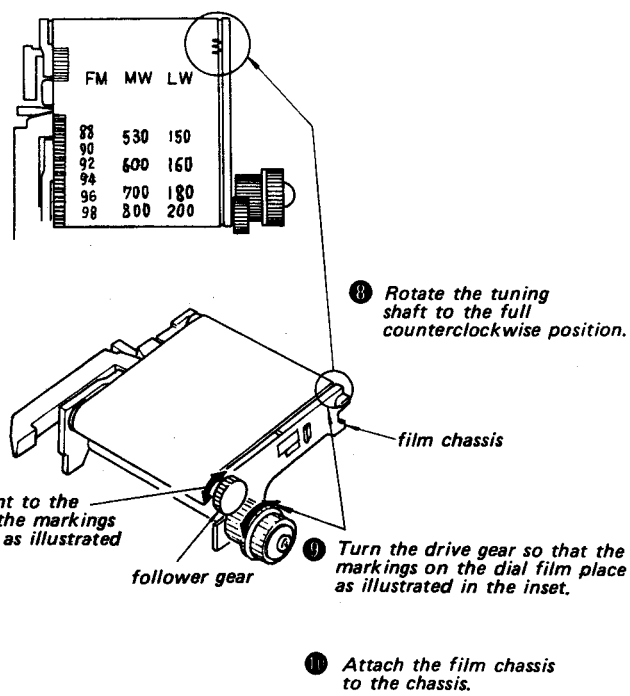


SECTION 2
DISASSEMBLY

2-1. DIAL FILM ATTACHMENT




follower gear
drive gear
❺ Pull off the drive gear not to gang with the follower gear.
❻ Turn the follower gear to the arrowed direction to eliminate any slack of the dial film. Holding the dial film not to be unwound, further turn the gear to wind the spring up.
follower gear
❼ Put the drive gear in to gang with the follower gear.
drive gear

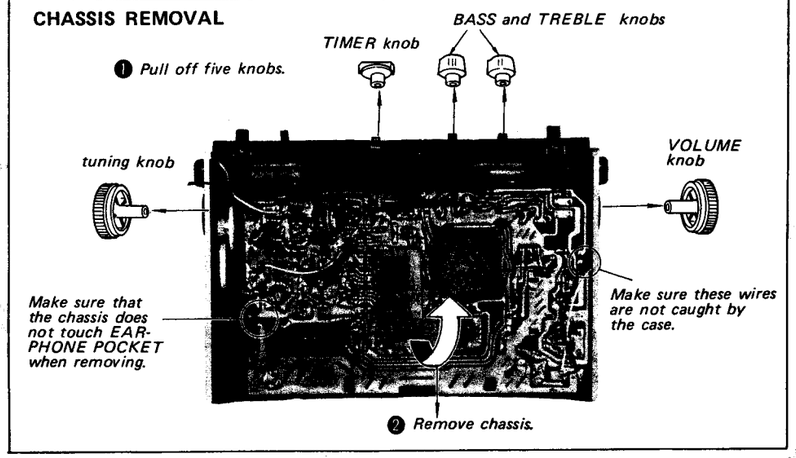

FM MW LW
88 530 150
90
92 600 160
94
96 700 180
98 800 200
❽ Rotate the tuning shaft to the full counterclockwise position.
film chassis
❶ Make a fine adjustment to the follower gear so that the markings on the dial film place as illustrated in the inset.
follower gear
❾ Turn the drive gear so that the markings on the dial film place as illustrated in the inset.
❿ Attach the film chassis to the chassis.

2-2. REMOVALS

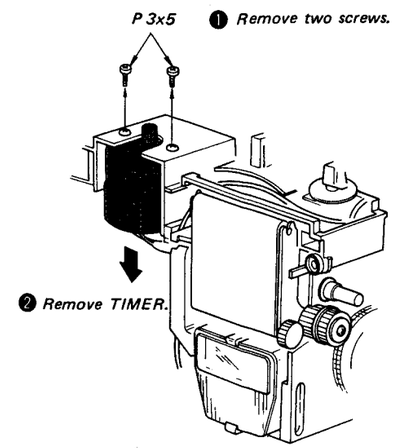
REAR CASE REMOVAL

Remove rear case by removing four screws, P 3 x 52.

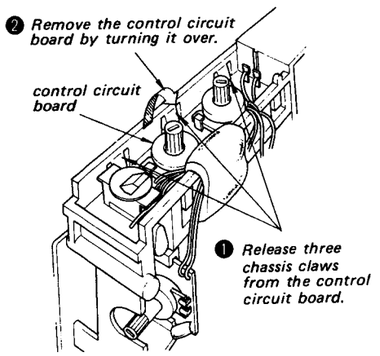
CHASSIS REMOVAL


TIMER knob
BASS and TREBLE knobs
❶ Pull off five knobs.
tuning knob
VOLUME knob
Make sure that the chassis does not touch EAR-PHONE POCKET when removing.
Make sure these wires are not caught by the case.
❷ Remove chassis.

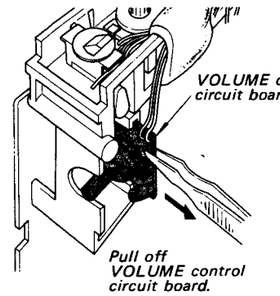
TIMER REMOVAL



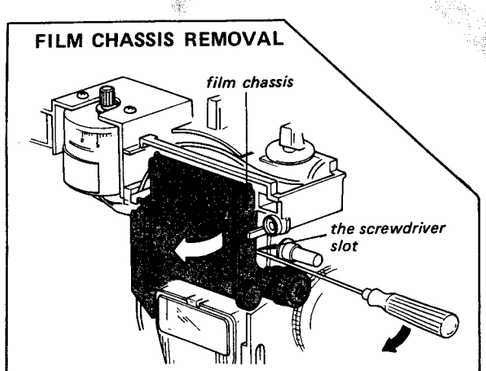
CONTROL CIRCUIT BOARD REMOVAL


❷ Remove the control circuit board by turning it over.
control circuit board
❶ Release three chassis claws from the control circuit board.

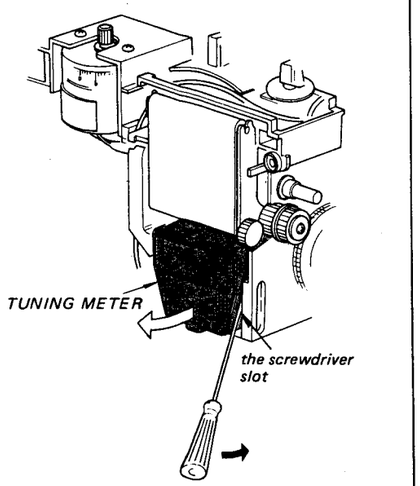
VOLUME CONTROL CIRCUIT BOARD REMOVAL



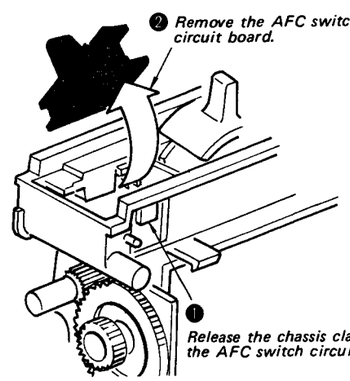
FILM CHASSIS REMOVAL



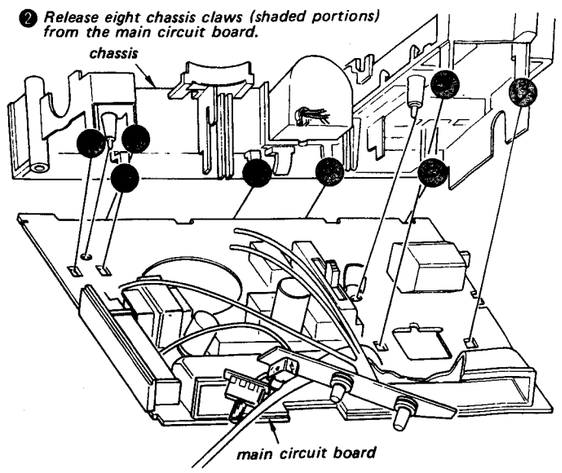
TUNING METER REMOVAL

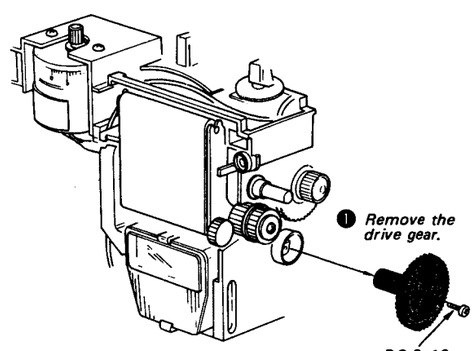


AFC SWITCH CIRCUIT BOARD REMOVAL



MAIN CIRCUIT BOARD REMOVAL





SECTION 3
ADJUSTMENTS

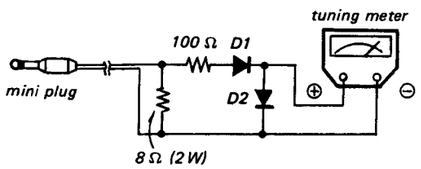
Test Equipment/Tools Required:

AM rf signal generator
FM rf signal generator
VTVM
VOM
Loop antenna
Lead antenna
8 Ω, 2 W resistor

Note: 1. Modulation
AM: 30 % amplitude modulation by 400 Hz signal.
FM: ±22.5 kHz frequency deviation modulated by 400 Hz signal.

2. AM, FM rf signal generator output level should be useable lowest possible for the following adjustments.

3. When 0.5~1.5 V AC range is not available on the VOM, use a tuning meter together with the network as shown below.

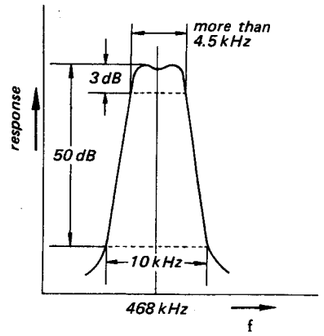


D1, 2: germanium power transistor, 2SB495, etc.

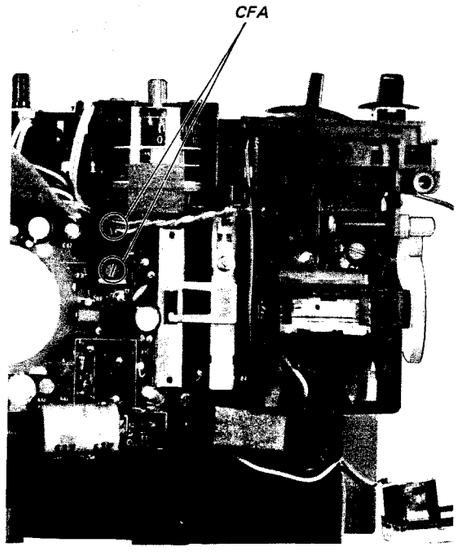
1. AM I-f Alignment

The ICF-5450L uses a ceramic filter (CFA) for AM (i.e. MW and SW) which is not able to be adjusted using an ordinary a-m signal generator–VOM method. Do not adjust the cores of CFA unless otherwise needed.

Note: Replacement CFA is carefully preadjusted at the factory, and no adjustment is needed when a new CFA is used in place of any defective CFA.
When an adjustment is needed to CFA by all means, use a sweep-marker generator and an oscilloscope, and obtain a frequency response as shown below.



Adjustment Location:

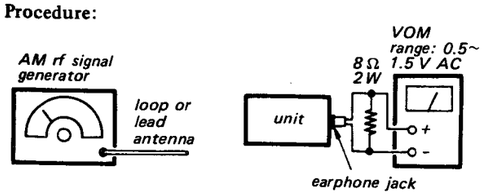


2. LW Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	LW
VOLUME control:	MAX
TONE controls:	MAX

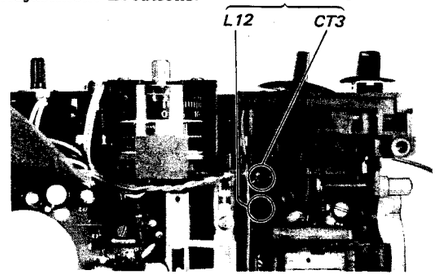
Procedure:

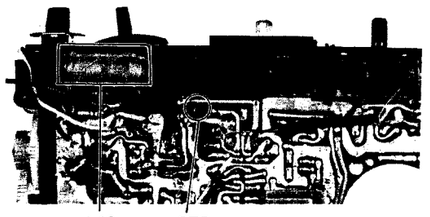


Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	145 kHz	fully counter-clockwise	L12	maximum
	2	300 kHz	fully clockwise	CT3	maximum
Tracking	1	180 kHz	tune in 3.8 MHz	L10	maximum
	2	260 kHz	tune in 12.3 MHz	CT5	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with steps 2.
* When adjusting CT5, remove the TIMER.

Adjustment Locations: *frequency converage*



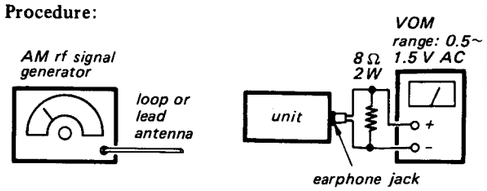


3. MW Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	MW
VOLUME control:	MAX
TONE controls:	MAX

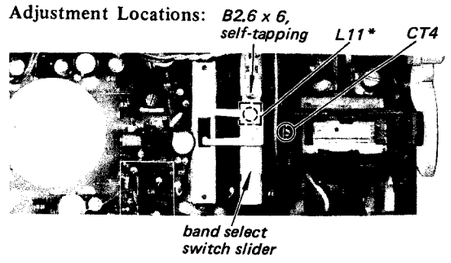
Procedure:

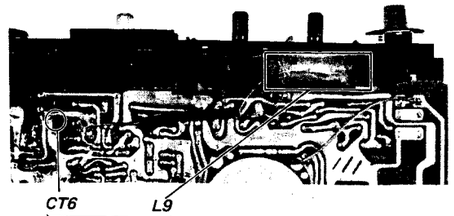


Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	520 kHz	fully counter-clockwise	L11*	maximum
	2	1,680 kHz	fully clockwise	CT4	maximum
Tracking	1	620 kHz	tune in 620 kHz	L9	maximum
	2	1,400 kHz	tune in 1,400 kHz	CT6	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2. Fix L9 with wax after adjustment.
* When adjusting L11, remove the band selector switch slider.

Adjustment Locations: *B2.6 x 6, self-tapping*



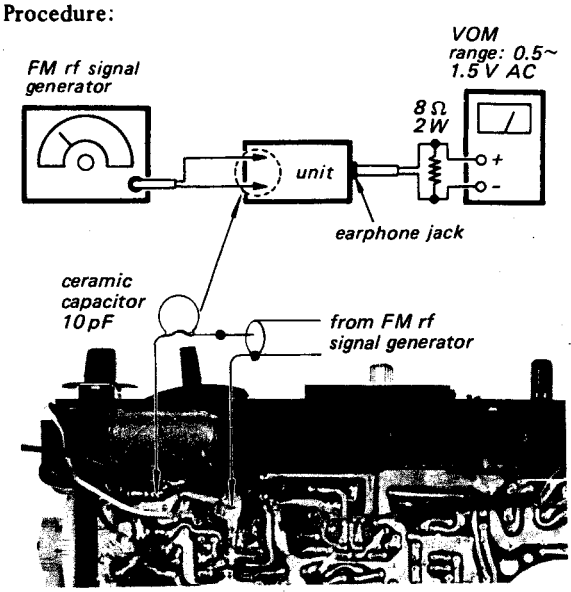


4. FM I-f Alignment and Discriminator Adjustment

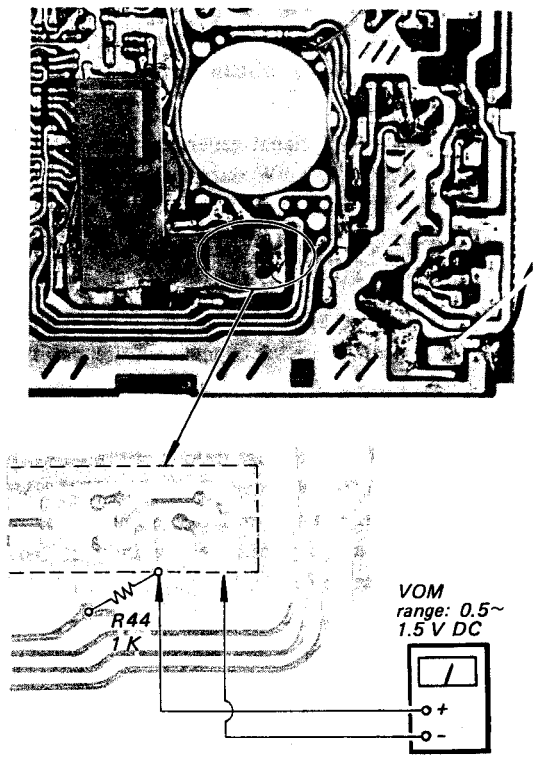
Settings:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE controls:	MAX
AFC switch:	OFF

Procedure:

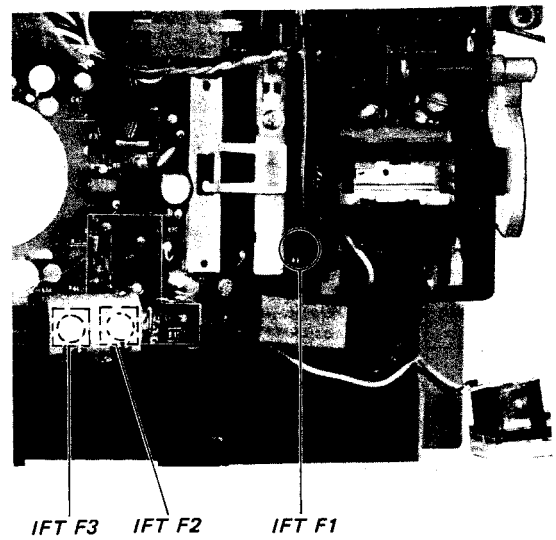


VOM connection for step 4.



Step	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
1	10.7 MHz with FM modulation	No station. no beating position	Rf signal generator frequency	maximum
2	- ditto -	- ditto -	IFT F1~3	maximum
3	Repeat steps 1 and 2 two or three times.			
4	Turn modulation off. Increase output a little.	- ditto -	IFT F3	"0 V DC"

Adjustment Location:

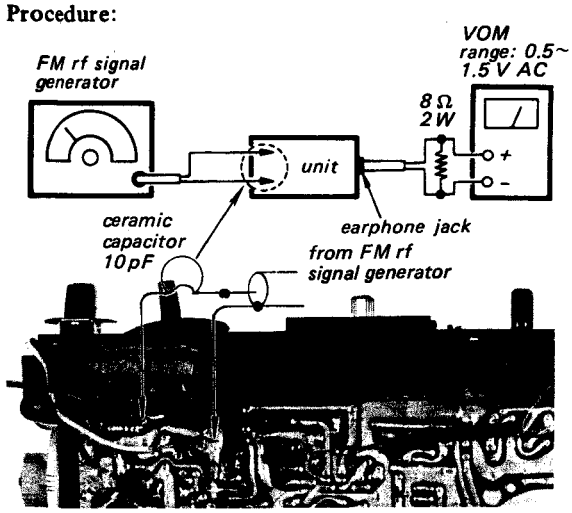


5. FM Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE controls:	MAX

Procedure:

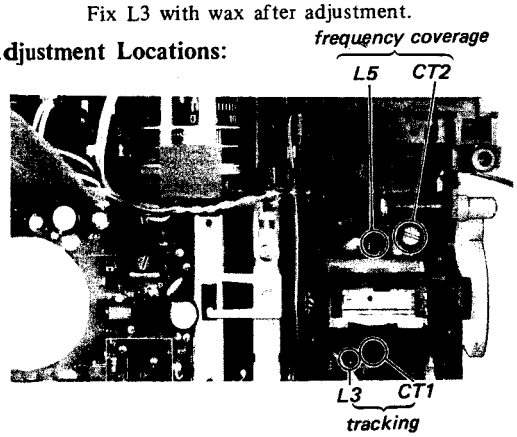


Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	87.1 MHz*	fully counter-clockwise	L5	maximum
	2	108.5 MHz*	fully clockwise	CT2	maximum
Tracking	1	87.1 MHz*	fully counter-clockwise	L3	maximum
	2	108.5 MHz*	fully clockwise	CT1	maximum

* In the Federal Republic of Germany, the frequencies should be 87.5 and 108 MHz.

Note: Repeat above steps two or three times until desired result is obtained ending with steps 2. Fix L3 with wax after adjustment.

Adjustment Locations:

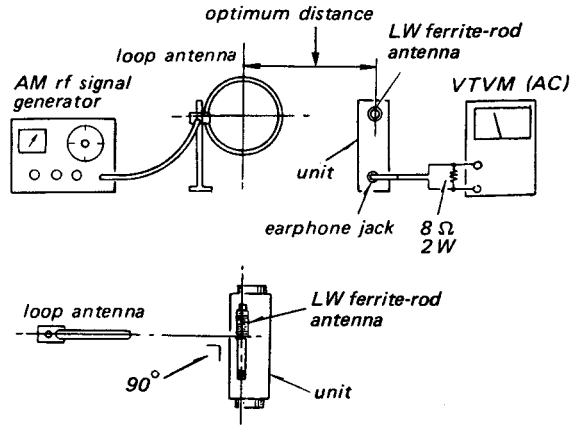


6. LW Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	LW
VOLUME control:	MAX
TONE controls:	MAX

Procedure:



Note: Distance between center of loop antenna and center axis of MW ferrite-rod antenna are dependent upon the specifications of the loop antenna used.

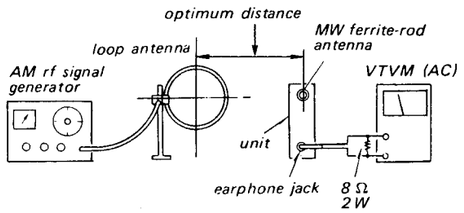
1. Set the AM rf signal generator frequency to 145 kHz, modulation to 400 Hz, 30 %.
2. Turn TUNING knob of the set and tune in 145 kHz signal to obtain maximum VTVM reading.
3. Vary the AM rf signal generator attenuator to obtain 0.64 V (50 mW output) on the VTVM. Note VTVM reading in dB.
4. Turn the modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 3 and 4 is the signal-to-noise ratio at this condition.
6. Adjust the AM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained keeping 0.64 V (50 mW output) varying VOLUME control. If the set is not operating normally, 50 mW output may not be obtained at 6 dB signal-to-noise ratio.
7. Read the amount of the signal generator attenuator and determine the maximum sensitivity.
8. LW maximum sensitivity is 316 μV/m (50 dB/m).

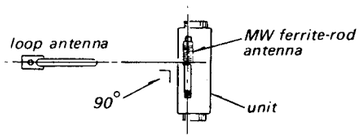
7. MW Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	MW
VOLUME control:	MAX
TONE controls:	MAX

Procedure:





Note: Distance between center of loop antenna and center axis of MW ferrite-rod antenna are dependent upon the specifications of the loop antenna used.

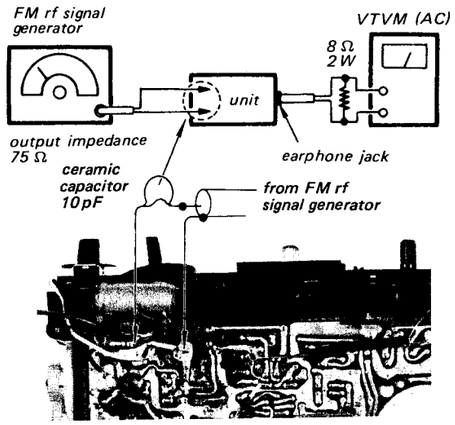
1. Set the AM rf signal generator frequency to 1,000 kHz, modulation to 400 Hz, 30 %.
2. Turn TUNING knob of the set and tune in 1,000 kHz signal to obtain maximum VTVM reading.
3. Vary the AM rf signal generator attenuator to obtain 0.64 V (50 mW output) on the VTVM. Note VTVM reading in dB.
4. Turn the modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 3 and 4 is the signal-to-noise ratio at this condition.
6. Adjust the AM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained keeping 0.64 V (50 mW output) varying VOLUME control. If the set is not operating normally, 50 mW output may not be obtained at 6 dB signal-to-noise ratio.
7. Read the amount of the signal generator attenuator and determine the maximum sensitivity.
8. MW maximum sensitivity is 100 μV/m (40 dB/m).

8. FM Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE controls:	MAX
AFC switch:	OFF

Procedure:



1. Set the FM rf signal generator frequency to 98 MHz, modulation to 400 Hz, 22.5 kHz deviation, attenuator to about 3 dB.
2. Turn TUNING knob of the set and tune in 98 MHz signal to obtain maximum VTVM reading.
3. Vary VOLUME control until 0.64 V (50 mW output) is obtained on VTVM. Note VTVM reading in dB. If 0.64 V is not obtained, increase FM rf signal generator attenuator to obtain 0.64 V VTVM reading.
4. Turn modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 3 and 4 is the signal-to-noise ratio at this condition.
6. Adjust the FM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained.
7. Repeat adjustment turning modulation on and off and varying VOLUME control keeping 0.64 V (50mW output) until desired 6 dB signal-to-noise ratio is obtained.
8. Read the amount of signal generator attenuator. This is the maximum sensitivity.
9. FM maximum sensitivity is 2.5 μV (8 dB).

MEMO

MEMO

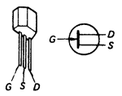
MEMO

SECTION 4
DIAGRAMS

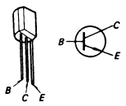
4-1. MOUNTING DIAGRAM

– Conductor Side –

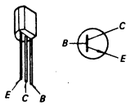
Q1: 2SK42



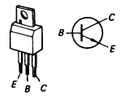
Q2~6, D1: 2SC710



Q7~9: 2SC945

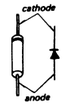


Q10, 11: 2SC1429

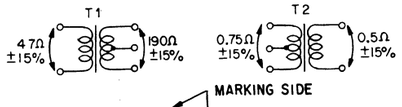


IC1: CX-075A

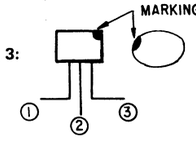
D2, 3: 1T261
D4~6: 1S1555



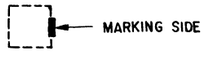
● **DC RESISTANCE**

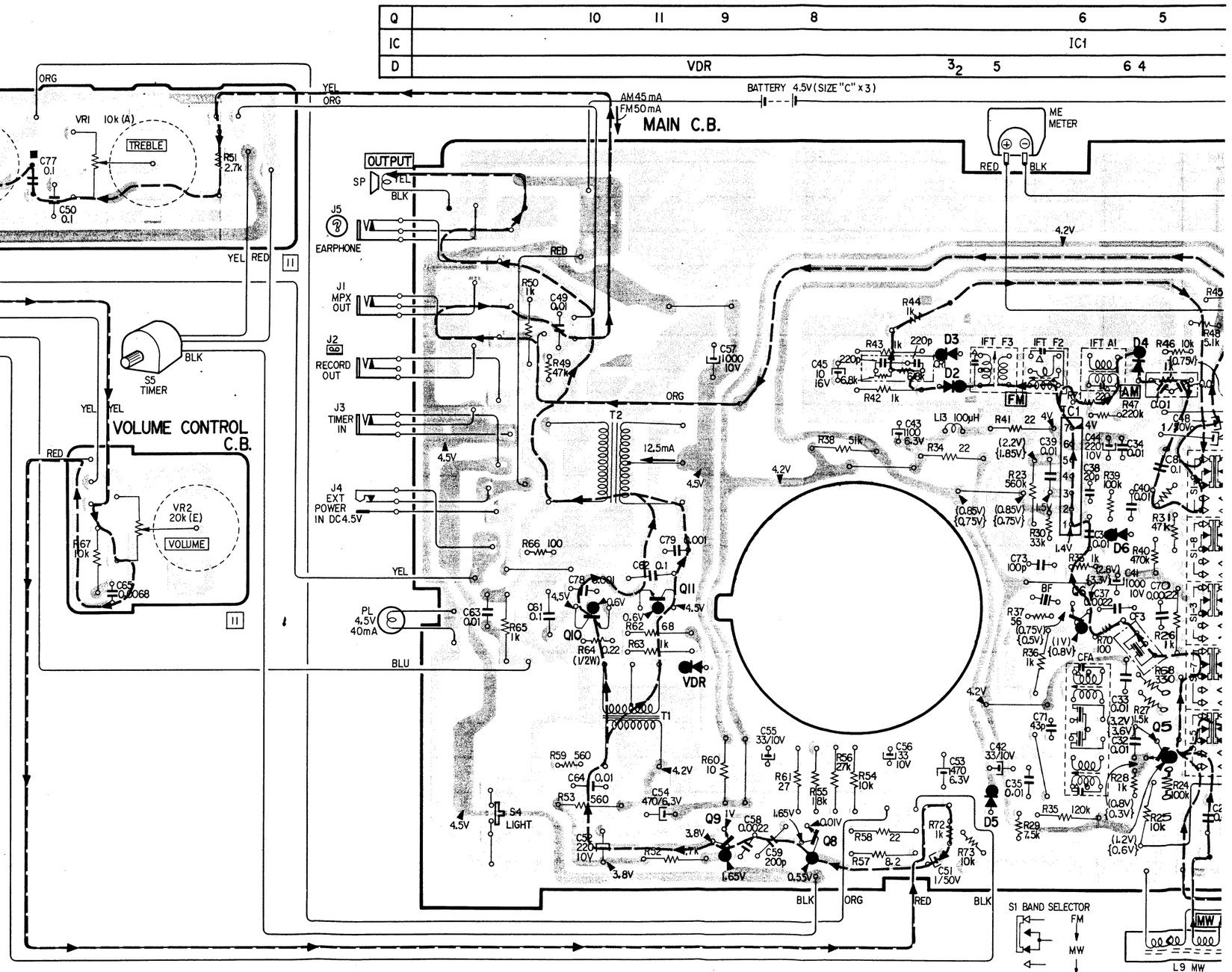


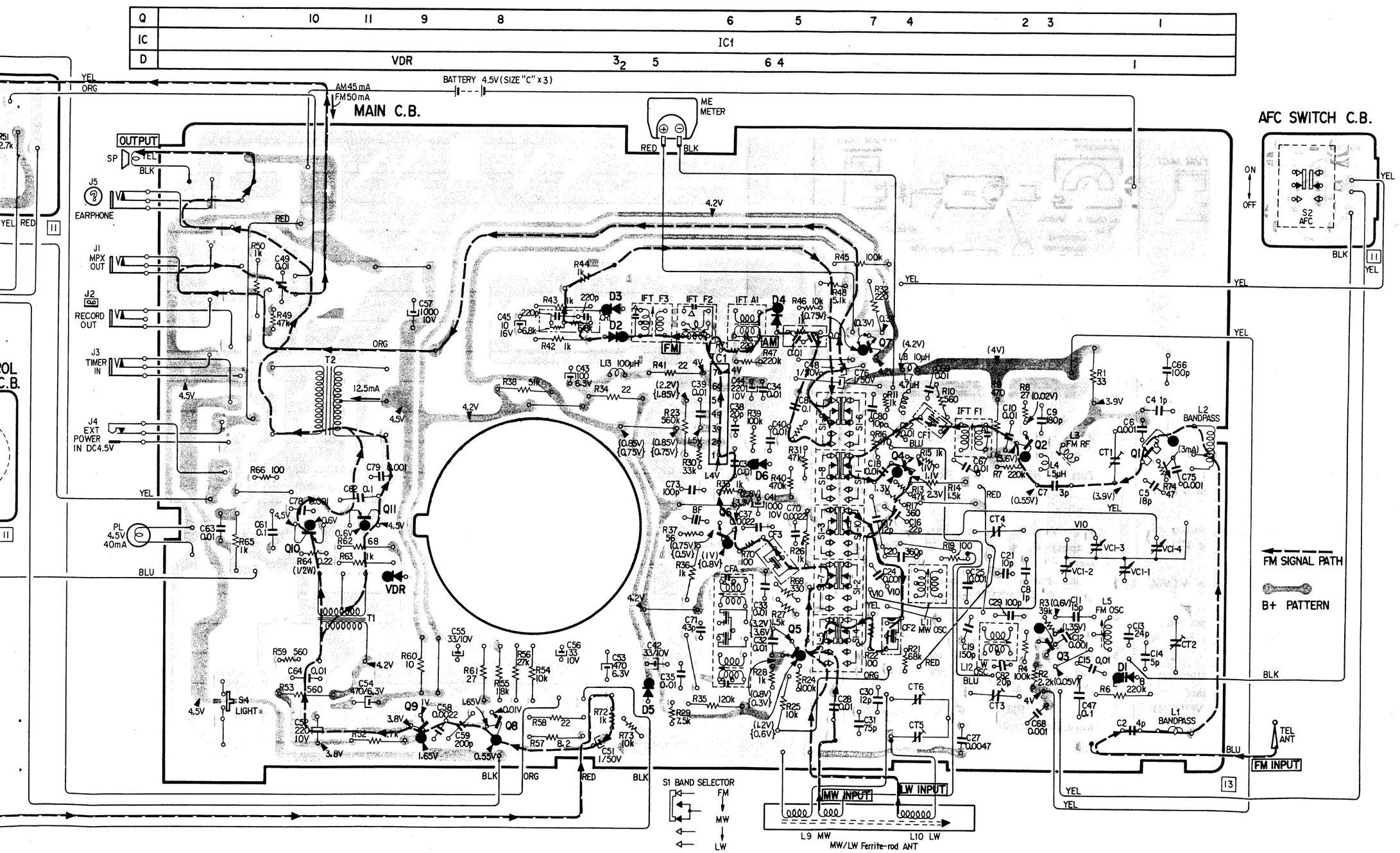
● **CF1, 2, 3:**



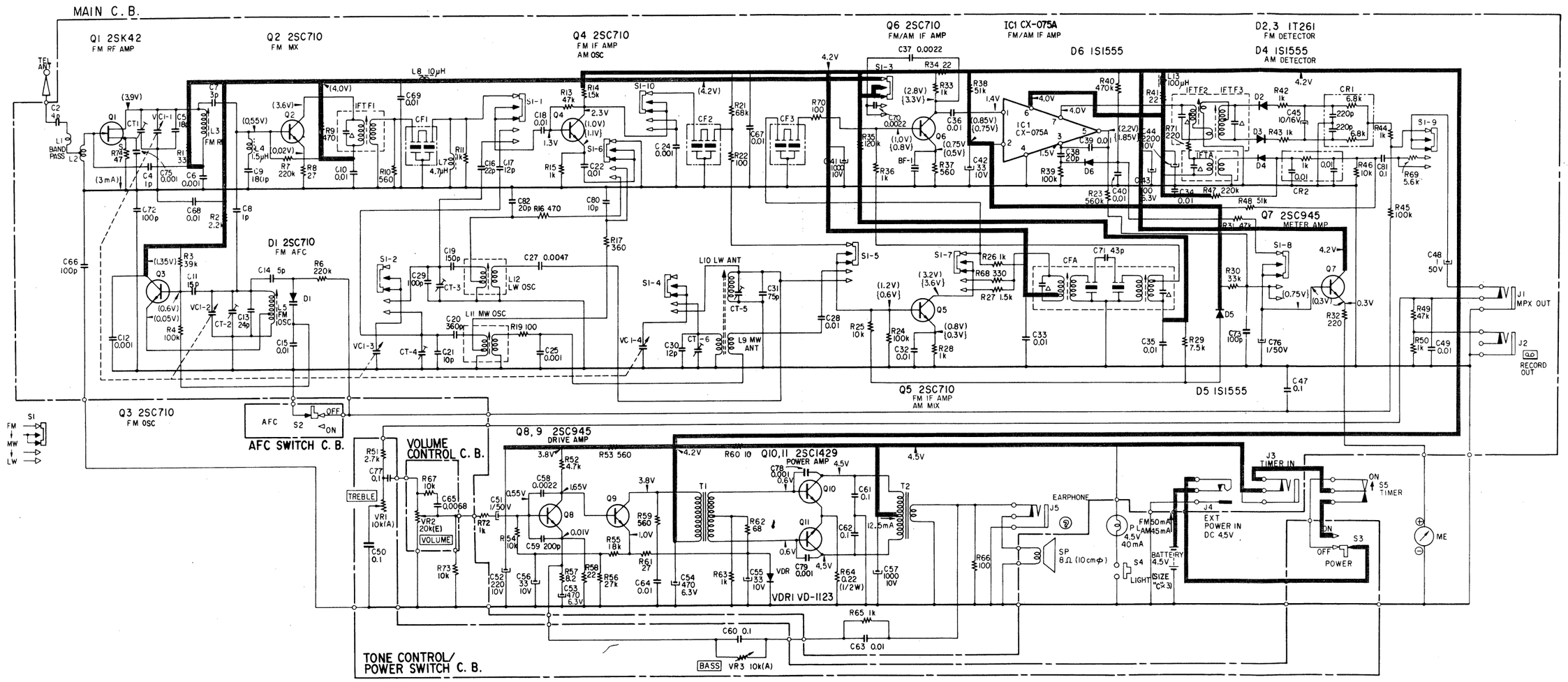
● **IC, IFT F2:**






Q 10 11 9 8 6 5 7 4 2 3 1
IC IC1
D VDR 3 2 5 6 4 1
BATTERY 4.5V (SIZE "C" x 3)
AM 45 mA
FM 50 mA
MAIN C.B.
ME METER
RED BLK
AFC SWITCH C.B.
ON OFF
S2 AFC
OUTPUT
SP
J5 EARPHONE
J1 MPX OUT
J2 RECORD OUT
J3 TIMER IN
J4 EXT POWER IN DC4.5V
PL 4.5V 40mA
S4 LIGHT
VDR
T1
T2
12.5mA
IFT F3
IFT F2
IFT A1
FM
AM
D1
D2
D3
D4
D5
D6
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
CF1 BLU
CF2 MW OSC
CF3
CFA
L1 BANDPASS
L2 BANDPASS
L3 FM RF
L4 1.5μH
L5 FM OSC
L6 10μH
L7 4.7μH
L8 10μH
L9 MW
L10 LW
L11 MW OSC
L12 LW OSC
MW/LW Ferrite-rod ANT
S1 BAND SELECTOR
FM
MW
LW
MW INPUT
LW INPUT
FM INPUT
TEL ANT
FM SIGNAL PATH
B+ PATTERN
VC1-1
VC1-2
VC1-3
VC1-4
VIO
YEL
ORG
RED
BLK
BLU
4.2V
4.5V
3.9V
1.65V
0.55V
3.8V

4-2. SCHEMATIC DIAGRAM



Note:

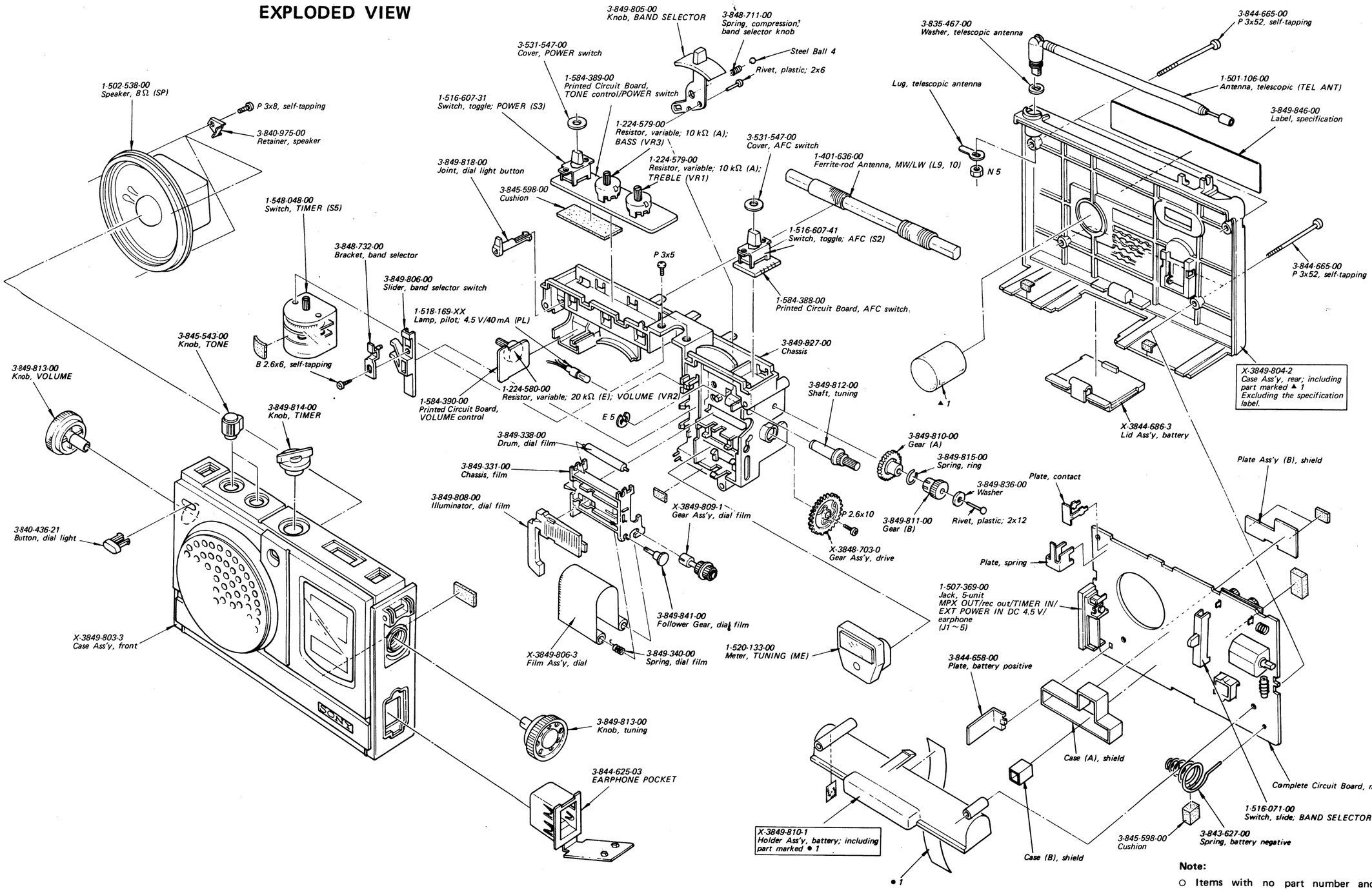
- All capacitors are in μF unless otherwise noted. p = μμF
- All resistors are in Ω, ¼W, unless otherwise noted. k = 1,000 M = 1,000 k
- Coil resistances are out-of-circuit values.
- △: indicates internal components.
- Parts indicated by ■ are mounted on the conductor side.
- C.B.: Circuit Board
- Transistor is used for D1 instead of diode.

- Voltages are DC with respect to ground unless otherwise noted. Readings taken under no-signal conditions with a VOM (20 kΩ/V).
  ( ): FM { }: LW/MW
  no mark: common
  ▬▬: B+
  Voltages between base and emitter are measured with 2.5 V range.
  Voltage variations may be noted due to normal production tolerances.

- Switch Mode

Ref. No.	Switch	Position
S1-1~1-10	BAND SELECTOR	FM
S2	AFC	OFF
S3	POWER	OFF
S4	LIGHT	OFF
S5	TIMER	OFF

SECTION 5
EXPLODED VIEW



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	CIRCUIT BOARDS	
	1-504-390-00	VOLUME Control
	1-584-388-00	AFC Switch
	1-584-389-00	TONE Control/POWER Switch
	SEMICONDUCTORS	
	Transistors	
Q1		2SK42 (FET)
Q2~6		2SC710
Q7~9		2SC945
Q10,11		2SC1429
	IC	
IC1		CX-075A
	Diodes	
D1		2SC710
D2,3		1T261
D4~6		1S1555
VDR1		VD1123
	TRANSFORMERS	
CFA	1-404-005-00	IFT, ceramic filter
IFT A	1-403-960-00	AM IFT
IFT F1	1-403-872-00	FM IFT
IFT F2	1-403-959-00	FM DISCRI (primary)
IFT F3	1-403-953-00	FM DISCRI (secondary)
T1	1-423-159-00	Input
T2	1-427-316-00	Output
	COILS	
L2	1-401-455-00	FM Bandpass
L3	1-425-888-00	FM RF
L4	1-407-180-XX	Microinductor, 1.5 μH
L5	1-405-568-00	FM OSC
L7	1-407-186-XX	Microinductor, 4.7 μH
L8	1-407-157-XX	Microinductor, 10 μH
L9, 10	1-401-636-00	Ferrite-rod Antenna, LW/MW
L11	1-405-520-00	MW OSC
L12	1-405-680-00	LW OSC
L13	1-407-169-XX	Microinductor, 100 μH

CAPACITORS

All capacitors are in μF and ceramic type unless otherwise noted. (p = μμF, elect = electrolytic) 50 or less working volts are omitted except for electrolytic type.

C2	1-102-937-11	4 p	
C4	1-102-934-11	1 p	
C5	1-102-953-11	18 p	
C6	1-102-074-11	0.001	
C7	1-102-936-11	3 p	
C8	1-102-934-11	1 p	
C9	1-107-091-11	180 p	silvered mica
C10	1-101-923-11	0.01	
C11	1-102-951-11	15 p	
C12	1-102-074-11	0.001	
C13	1-102-721-11	24 p	
C14	1-101-997-11	5 p	
C15	1-101-923-11	0.01	
C16	1-102-959-11	22 p	
C17	1-102-949-11	12 p	
C18	1-101-923-11	0.01	
C19	1-107-089-11	150 p	silvered mica
C20	1-103-714-11	360 p	styrol
C21	1-102-947-11	10 p	
C22, 23	1-101-923-11	0.01	
C24	1-102-074-11	0.001	
C25	1-102-074-11	0.001	

Ref. No.	Part No.		Description
C27	1-102-125-11	0.0047	
C28	1-101-923-11	0.01	
C29	1-102-973-11	100 p	
C30	1-102-949-11	12 p	
C31	1-101-890-11	75 p	
C32	1-101-923-11	0.01	
C33	1-106-082-12	0.01	mylar
C34	1-101-118-11	0.01	
C35, 36	1-101-923-11	0.01	
C37	1-102-121-11	0.0022	
C38	1-102-958-11	20 p	
C39, 40	1-101-923-11	0.01	
C41	1-121-736-11	1000	10 V elect
C42	1-121-402-11	33	10 V elect
C43	1-121-413-11	100	6.3 V elect
C44	1-121-658-11	2200	6.3 V elect
C45	1-121-651-11	10	16 V elect
C47	1-101-797-11	0.1	
C48	1-121-391-11	1	50 V elect
C49	1-106-082-12	0.01	mylar
C50	1-101-797-11	0.1	
C51	1-121-391-11	1	50 V elect
C52	1-121-420-11	220	10 V elect
C53, 54	1-121-424-11	470	6.3 V elect
C55, 56	1-121-402-11	33	10 V elect
C57	1-121-736-11	1000	10 V elect
C58	1-102-121-11	0.0022	
C59	1-107-092-11	200 p	silvered mica
C60~62	1-101-797-11	0.1	
C63, 64	1-101-118-11	0.01	
C65	1-108-276-12	0.0068	mylar
C66	1-102-973-11	100 p	
C67~69	1-101-923-11	0.01	
C70	1-102-121-11	0.0022	
C71	1-102-966-11	43 p	
C73	1-102-973-11	100 p	
C75	1-102-074-11	0.001	
C76	1-121-391-11	1	50 V elect
C77	1-101-797-11	0.1	
C78, 79	1-102-074-11	0.001	
C80	1-102-947-11	10 p	
C81	1-101-797-11	0.1	
C82	1-102-958-11	20 p	
CT1, 2	1-141-097-21	Trimmer	
CT3, 4	1-141-144-00	Trimmer	
CT5, 6	1-141-097-31	Trimmer	
VC1	151-196-00	Tuning	

RESISTORS

All resistors are in Ω, ¼W. Regular type ± 5 % carbon and composition resistors are omitted. Check schematic diagram for resistance values. k = 1000, M = 1000k

R64	1-207-455-11	22	½W wirewound
VR1	1-224-579-00	10k (A), variable; TREBLE	
VR2	1-224-580-00	20k (E), variable; VOLUME	
VR3	1-224-579-00	10k (A), variable; BASS	

SWITCHES

S1	1-516-071-00	Slide, BAND SELECTOR
S2	1-516-607-41	Toggle, AFC
S3	1-516-607-31	Toggle, POWER
S4		LIGHT (built in main circuit board)
S5	1-548-048-00	TIMER

FILTERS

BF1	1-403-997-00	AM, ceramic
CF1	1-527-198-11	FM I-f, ceramic; 10.70 MHz (red)
CF2	1-527-198-21	FM I-f, ceramic; 10.67 MHz (blue)
CF3	1-527-198-31	FM I-f, ceramic; 10.73 MHZ (orange)

MISCELLANEOUS

CR1	1-231-202-00	Encapsulated Component, 6.8 kΩ + 6.8 kΩ + 220 pF + 220 pF
CR2	1-231-211-00	Encapsulated Component, 1 kΩ + 0.01 μF + 0.01 μF
J1~5	1-507-369-00	Jack, 5-unit (MPX OUT/rec out/ TIMER IN/EXT POWER IN DC 4.5 V/earphone)
ME	1-520-133-00	TUNING METER
PL	1-518-169-XX	Lamp, pilot; 4.5 V/40 mA
SP	1-502-538-00	Speaker, 8 Ω
TEL ANT	1-501-106-00	Antenna, telescopic

Part No.	*Description*
	HARDWARE
	SCREWS
	All screws are Phillips (cross recess) type unless otherwise noted.
7-621-259-65	P 2.6 x 10
7-682-146-01	P 3 x 5
7-685-146-11	P 3 x 8, self-tapping
7-685-533-21	B 2.6 x 6, self-tapping
	MISCELLANEOUS
7-623-107-11	Washer 2.6
7-624-109-01	Retaining Ring E-5
7-625-208-60	Nylon Rivet 2 x 6
7-625-209-20	Nylon Rivet 2 x 12
7-671-114-01	Steel Ball 4
7-684-035-00	Nut 5

Part No.	*Description*
	ACCESSORIES
X-3840-409-0	Strap, shoulder
1-504-034-12	Earphone, ME-20
3-995-724-11	Manual, instruction

When ordering replacement parts, use PART NUMBERS listed in Parts List or shown in EXPLODED VIEW.
Parts List reference numbers should not be used.

P – Pan Head Screw .....
PS – Pan Head Screw with Spring Washer .....
K – Flat Countersunk Head Screw ...
B – Binding Head Screw .....
RK – Oval Countersunk Head Screw ..
T – Truss Head Screw .....
R – Round Head Screw .....
F – Flat Fillister Head Screw .....

SC – Set Screw .....
E – Retaining Ring (E Washer) .....

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

P 3×10
- Length in mm (L)
- Diameter in mm (D)
- Type of Head